CLAIMS:

1. A method of indicating pH levels in an animal, the method comprising:
   a) obtaining measurements corresponding to the body temperature of the animal at periodic sampling intervals;
   b) applying an algorithm to the measurements obtained from a) which algorithm cumulatively takes account of variations in body temperature over time; and
   c) comparing the results of the algorithm to a predetermined threshold.

2. A method of indicating pH levels in an animal, the method comprising:
   a) obtaining measurements corresponding to the body temperature of the animal at periodic sampling intervals;
   b) applying an algorithm to the measurements obtained from a) which algorithm cumulatively takes account of variations in body temperature over time; and
   c) correlating the results of the algorithm with the pH standard.

3. The method as claimed in claim 1 or claim 2 wherein ten or more measurements corresponding to body temperature are taken.

4. The method as claimed in any one of the preceding claims wherein the measurements are taken for a predetermined time period.

5. The method as claimed in claim 4 wherein the predetermined time period is at least 12 hours.

6. The method as claimed in claim 4 or claim 5 wherein the predetermined time period extends up to 24 hours.

7. The method as claimed in any one of the claims wherein the algorithm is applied at the end of the predetermined time period.

8. The method as claimed in claim 7, wherein b) further comprises:
determining that animal's average mean temperature reading over the predetermined time period;
calculating the variance between each measurement taken under a) and the mean determined; and
adding all variances to obtain the cumulative temperature variance score.

9. The method as claimed in any one of claims 1 to 6 wherein the algorithm is applied progressively.

10. The method as claimed in claim 9 wherein the algorithm is applied progressively as each measurement corresponding to body temperature is taken.

11. The method as claimed in claim 9 or claim 10 wherein c) is conducted after each application of the algorithm.

12. The method as claimed in any one of the preceding claims wherein c) comprises comparing the results of the algorithm to a predetermined threshold and further, in the event of the threshold being exceeded, providing an indication of the threshold being exceeded.

13. The method as claimed in claim 12 further including setting the animal aside for a predetermined animal withholding period in the event of the threshold being exceeded.

14. The method as claimed in any one of claims 9 to 13 wherein a mean is calculated progressively as each measurement corresponding to temperature is taken.

15. The method as claimed in any one of claims 9 to 13 wherein the algorithm is as follows:

where:

t_{ear} is the instantaneous ear temperature;

$t_{ambient}$ is the instantaneous ambient air temperature;

d is the difference between ear and ambient temperatures;

fast is the fast-response filter element;

slow is the slow response filter element;

v is the integral of the difference between the two filter elements;

c_1 is the time constant of the fast filter;

c_2 is the time constant of the slow filter;

Time constants are such that $c_1 > c_2$, $0 < c_1 < 1, 0 < c_2 < 1$;

where initially:

$n=1$

$d_0 = t_{ear} - t_{ambient}$

$fast_0 = d_0$

$slow_0 = d_0$

$v_0 = 0$

and where at each sampling interval:

$$d_n = t_{ear} - t_{ambient}$$

$$fast_n = (1-c_1)*fast_{n-1} + c_1*d_n$$

$$slow_n = (1-c_2)*slow_{n-1} + c_2*d_n$$

then: $v_n = v_{n-1} + (fast_n - slow_n)$.

16. The method as claimed in claim 2 wherein an indication of a pH level greater than 5.8 indicates meat of poor quality.

17. The method as claimed in any one of the preceding claims wherein the measurements are taken on the outer part of the animal's body.

18. The method as claimed in claim 17 wherein skin temperature measurements are taken and compensation is provided for ambient temperature and/or solar radiation.

19. The method as claimed in claim 17 wherein measurements are taken in the ear canal of the animal.

20. A method of providing an indication of stress levels in an animal, the method comprising:

a) obtaining measurements corresponding to the body temperature of the animal at periodic sampling intervals;

b) applying an algorithm to the measurements obtained from a) which algorithm cumulatively takes account of variations in body temperature over time; and

c) comparing the results of the algorithm to a predetermined threshold.

21. A method of providing an indication of stress levels in an animal, the method comprising:

a) obtaining measurements corresponding to the body temperature of the animal at periodic sampling intervals;

b) applying an algorithm to the measurements obtained from a) which algorithm cumulatively takes account of variations in body temperature over time; and

c) correlating the results of the algorithm with a stress standard.

22. The method as claimed in claim 20 or claim 21 wherein ten or more measurements corresponding to body temperature are taken.

23. The method as claimed in any one of claims 20 to 22 wherein the measurements are taken for a predetermined time period.

24. The method as claimed in claim 23 wherein the predetermined time period is at least 12 hours.

25. The method as claimed in claim 23 or claim 24 wherein the predetermined time period extends up to 24 hours.

26. The method as claimed in any one of the claims 20 to 25 wherein the algorithm is applied at the end of the predetermined time period.

27. The method as claimed in claim 26, wherein b) further comprises:

a) determining that animal's mean body temperature reading over the predetermined time period;

b) calculating the variance between each measurement taken under a) and the mean determined; and

c) adding all variances to obtain the cumulative temperature variance score.

28. The method as claimed in any one of claims 20 to 25 wherein the algorithm is applied progressively.

29. The method as claimed in claim 28 wherein the algorithm is applied progressively as each measurement corresponding to body temperature is taken.

30. The method as claimed in claim 28 or claim 29 wherein c) is conducted after each application of the algorithm.

31. The method as claimed in any one of claims 20 to 30 wherein c) comprises comparing the results of the algorithm to a predetermined threshold and further, in the event of the threshold being exceeded, providing an indication of the threshold being exceeded.

32. The method as claimed in claim 31 further including setting the animal aside for at least a predetermined animal withholding period in the event of the threshold being exceeded.

33. The method as claimed in any one of claims 28 to 32 wherein a mean is calculated progressively as each measurement corresponding to temperature is taken.

34. The method as claimed in any one of claims 28 to 32 wherein the algorithm is as follows:

where:

t_{ear} is the instantaneous ear temperature;

$t_{ambient}$ is the instantaneous ambient air temperature;

d is the difference between ear and ambient temperatures;

fast is the fast-response filter element;

slow is the slow response filter element;

v is the integral of the difference between the two filter elements;

c_1 is the time constant of the fast filter;

c_2 is the time constant of the slow filter;

Time constants are such that $c_1 > c_2$, $0 < c_1 < 1$, $0 < c_2 < 1$;

where initially:

$n=1$

$d_0=t_{ear}-t_{ambient}$

$fast_0=d_0$

$slow_0=d_0$

$v_0=0$

and where at each sampling interval:

$d_n = t_{ear} - t_{ambient}$

$fast_n = (1-c_1)*fast_{n-1} + c_1*d_n$

$slow_n = (1-c_2)*slow_{n-1} + c_2*d_n$

then: $v_n = v_{n-1} + (fast_n-slow_n)$.

35. The method as claimed in any one of claims 20 to 34 wherein the measurements are taken on the outer part of the animal's body.

36. The method as claimed in claim 35 wherein skin temperature measurements are taken and compensation is provided for ambient temperature and/or solar radiation.

37. The method as claimed in claim 35 wherein measurements are taken in the ear canal of the animal.

38. A method of measuring stress levels in an animal, the method comprising measuring the animal's pH level using a method of any one of claims 1 to 19, a pH level greater than 5.8 to 6.2 indicating a stressed animal.

39. A method of providing an indication of meat quality in an animal, the method comprising:

a) obtaining measurements corresponding to the body temperature of the animal at periodic sampling intervals;

b) applying an algorithm to the measurements obtained from a), which algorithm cumulatively takes account of variations in body temperature over time; and

c) comparing the results of the algorithm to a predetermined threshold.

40. A method of providing an indication of meat quality in an animal, the method comprising:

a) obtaining measurements corresponding to the body temperature of the animal at periodic sampling intervals;

b) applying an algorithm to the measurements obtained from a), which algorithm cumulatively takes account of variations in body temperature over time; and

c) correlating the results of the algorithm with a meat tenderness standard.

41. The method as claimed in claim 39 or claim 40 wherein ten or more measurements corresponding to body temperature are taken.

42. The method as claimed in any one of claims 39 to 41 wherein the measurements are taken for a predetermined time period.

43. The method as claimed in claim 42 wherein the predetermined time period is at least 12 hours.

44. The method as claimed in claim 42 wherein the predetermined time period extends up to 24 hours.

45. The method as claimed in any one of claims 39 to 44 wherein the algorithm is applied at the end of the predetermined time period.

46. The method as claimed in claim 45, wherein b) further comprises:
determining that animal's mean body temperature reading over the predetermined time period;
calculating the variance between each measurement taken under a) and the mean determined; and
adding all variances to obtain the cumulative temperature variance score.

47. The method as claimed in any one of claims 39 to 44 wherein the algorithm is applied progressively.

48. The method as claimed in claim 47 wherein the algorithm is applied progressively as each measurement corresponding to body temperature is taken.

49. The method as claimed in claim 47 or 48 wherein c) is conducted after each application of the algorithm.

50. The method as claimed in any one of claims 39 to 49 wherein c) comprises comparing the results of the algorithm to a predetermined threshold and further, in the event of the threshold being exceeded, providing an indication of the threshold being exceeded.

51. The method as claimed in claim 50 further including setting the animal aside for a predetermined animal withholding period in the event of the threshold being exceeded.

52. The method as claimed in any one of claims 47 to 51 wherein a mean is calculated progressively as each measurement corresponding to temperature is taken.

53. The method as claimed in any one of claims 47 to 51 wherein the algorithm is as follows:

where:

t_{ear} is the instantaneous ear temperature;

$t_{ambient}$ is the instantaneous ambient air temperature;

d is the difference between ear and ambient temperatures;

fast is the fast-response filter element;

slow is the slow response filter element;

v is the integral of the difference between the two filter elements;

c_1 is the time constant of the fast filter;

c_2 is the time constant of the slow filter;

Time constants are such that $c_1 > c_2$, $0 < c_1 < 1, 0 < c_2 < 1$;

where initially:

$n=1$

$d_0 = t_{ear} - t_{ambient}$

$fast_0 = d_0$

$slow_0 = d_0$

$v_0 = 0$

and where at each sampling interval:

$d_n = t_{ear} - t_{ambient}$

$fast_n = (1-c_1)*fast_{n-1} + c_1*d_n$

$slow_n = (1-c_2)*slow_{n-1} + c_2*d_n$

then: $v_n = v_{n-1} + (fast_n - slow_n)$.

54. The method as claimed in any one of claims 39 to 53 wherein the measurements are taken on the outer part of the animal's body.

55. The method as claimed in claim 54 wherein skin temperature measurements are taken and compensation is provided for ambient temperature and/or solar radiation.

56. The method as claimed in claim 54 wherein measurements are taken in the ear canal of the animal.

57. A system for providing an indication of meat quality in an animal to be slaughtered, the system including:
a body mountable measurement device for obtaining measurements corresponding to the body temperature of the animal at periodic sampling intervals over a period of between 3-36 hours;
a processor having an input means to receive the measurements from the measurement device, the processor operable to implement an algorithm to the measurements, which algorithm cumulatively takes account of variations in body temperature over time, wherein the processor has an output means for the result of the algorithm.

58. The system as claimed in claim 57 wherein the algorithm is as follows:
determine the animal's mean body temperature from the measurements;
calculate the variance between each measurement and the mean; and
add all variances to obtain a cumulative variance score.

59. The system as claimed in claim 57 wherein the algorithm is as follows:
where:

t_{ear} is the instantaneous ear temperature;

$t_{ambient}$ is the instantaneous ambient air temperature;

d is the difference between ear and ambient temperatures;

fast is the fast-response filter element;

slow is the slow response filter element;

v is the integral of the difference between the two filter elements;

c_1 is the time constant of the fast filter;

c_2 is the time constant of the slow filter;

Time constants are such that $c_1 > c_2$, $0 < c_1 < 1$, $0 < c_2 < 1$;

where initially:

$n=1$

$d_0 = t_{ear} - t_{ambient}$

$fast_0 = d_0$

$slow_0 = d_0$

$v_0 = 0$

and where at each sampling interval:

$d_n = t_{ear} - t_{ambient}$

$fast_n = (1-c_1)*fast_{n-1} + c_1*d_n$

$slow_n = (1-c_2)*slow_{n-1} + c_2*d_n$

then: $v_n = v_{n-1} + (fast_n - slow_n)$.

60. The system as claimed in any one of claims 57 to 59 wherein the system is embodied in an all-in-one indicator device.

61. The system as claimed in claim 60 wherein the device is provided in the form of an ear tag.

62. The system as claimed in claim 61 wherein the tag incorporates the measurement device.

63. The system as claimed in any one of claims 57 to 59, wherein the processor is provided by way of a remote computer.

64. The system as claimed in any one of claims 57 to 63 wherein the processor is adapted to output a numeric value from a comparison with a meat tenderness scale.

65. The system as claimed in any one of claims 57 to 63 wherein the processor is operable to compare the output of the algorithm to a predetermined threshold.

66. The system as claimed in claim 65 further including an indicator to indicate where the output of the algorithm has exceeded the predetermined threshold.

67. The system as claimed in claim 66 wherein the indicator is also operable to provide an indication that the system is functioning.

68. A system for indicating cumulative stress in an animal, the system including:
a body mountable measurement device for obtaining measurements corresponding to outer body temperature of the animal at periodic time intervals over a period of between 3-6 hours;
a processor having an input to receive measurements from the measurement device, the processor operable to implement an algorithm to the measurements, which algorithm cumulatively takes account of variations in body temperature over time, wherein the processor has an output for the result of the algorithm.

69. The system as claimed in claim 68 wherein the algorithm is as follows:
determine the animal's average body temperature from the measurements;
calculate the variance between each measurement and the average; and

add all variances to obtain a cumulative variance score.

70. The system as claimed in claim 68 wherein the algorithm is as follows:

where:

t_{ear} is the instantaneous ear temperature;

$t_{ambient}$ is the instantaneous ambient air temperature;

d is the difference between ear and ambient temperatures;

fast is the fast-response filter element;

slow is the slow response filter element;

v is the integral of the difference between the two filter elements;

c_1 is the time constant of the fast filter;

c_2 is the time constant of the slow filter;

Time constants are such that $c_1 > c_2$, $0 < c_1 < 1$, $0 < c_2 < 1$;

where initially:

$n=1$

$d_0 = t_{ear} - t_{ambient}$

$fast_0 = d_0$

$slow_0 = d_0$

$v_0 = 0$

and where at each sampling interval:

$d_n = t_{ear} - t_{ambient}$

$fast_n = (1-c_1)*fast_{n-1} + c_1*d_n$

$slow_n = (1-c_2)*slow_{n-1} + c_2*d_n$

then: $v_n = v_{n-1} + (fast_n - slow_n)$.

71. The system as claimed in any one of claims 68 to 70 wherein the system is embodied in an all-in-one indicator device.

72. The system as claimed in claim 71 wherein the device is provided in the form of an ear tag.

73. The system as claimed in claim 72 wherein the tag incorporates the measurement device.

74. The system as claimed in any one of claims 68 to 70 wherein the processor is provided by way of a remote computer.

75. The system as claimed in any one of claims 68 to 74 wherein the processor is adapted to output a numeric value or comparison with a meat tenderness scale.

76. The system as claimed in any one of claims 68 to 74 wherein the processor is operable to compare the output of the algorithm to a predetermined threshold.

77. The system as claimed in claim 76 further including an indicator to indicate where the output of the algorithm has exceeded the predetermined threshold.

78. The system as claimed in claim 77 wherein the indicator is operable to indicate that the system is functioning.

79. A system of indicating pH in an animal, the system including:
a body mountable measurement device for obtaining measurements corresponding to outer
body temperature of the animal at periodic time intervals over a period of between 3-6 hours;
a processor having an input to receive measurements from the measurement

device, the processor operable to implement an algorithm to the measurements, which algorithm cumulatively takes account of variations in body temperature over time, wherein the processor has an output for the result of the algorithm.

80. The system as claimed in claim 79 wherein the algorithm is as follows:
determine the animal's average body temperature from the measurements;
calculate the variance between each measurement and the average; and
add all variances to obtain a cumulative variance score.

81. The system as claimed in claim 79 wherein the algorithm is as follows:

where:

t_{ear} be the instantaneous ear temperature;

$t_{ambient}$ be the instantaneous ambient air temperature;

d is the difference between ear and ambient temperatures;

fast is the fast-response filter element;

slow is the slow response filter element;

v is the integral of the difference between the two filter elements;

c_1 is the time constant of the fast filter;

c_2 is the time constant of the slow filter;

Time constants are such that $c_1 > c_2$, $0 < c_1 < 1$, $0 < c_2 < 1$;

where initially:

$n=1$

$d_0 = t_{ear} - t_{ambient}$

$fast_0=d_0$

$slow_0=d_0$

$v_0=0$

and where at each sampling interval:

$d_n = t_{ear} - t_{ambient}$

$fast_n = (1-c_1)*fast_{n-1} + c_1*d_n$

$slow_n = (1-c_2)*slow_{n-1} + c_2*d_n$

then: $v_n = v_{n-1} + (fast_n-slow_n)$.

82. The system as claimed in any one of claims 79 to 81 wherein the system is embodied in an all-in-one indicator device.

83. The system as claimed in claim 82 wherein the device is provided in the form of an ear tag.

84. The system as claimed in claim 83 wherein the tag incorporates the measurement device.

85. The system as claimed in any one of claims 70 to 81 wherein the processor is provided by way of a remote computer.

86. The system as claimed in any one of claims 79 to 85 wherein the processor is adapted to output a numeric value from a comparison with a meat tenderness scale.

87. The system as claimed in any one of claims 79 to 85 wherein the processor is operable to compare the output of the algorithm to a predetermined threshold.

88. The system as claimed in claim 87 further including an indicator to indicate where the output of the algorithm has exceeded the predetermined threshold.

89. A temperature sensing device including:
a tag having an attachment portion to extend through a body part of an animal, the tag incorporating an indicator means; and
one or more animal temperature sensors disposed on/in the attachment portion for contact with the animal during use.

90. The tag as claimed in claim 89 wherein the tag is an ear tag.

91. The tag as claimed in claim 89 or claim 90 wherein, an ambient temperature sensor is also provided on the tag.

92. The tag as claimed in any one of claims 89 to 91 wherein a comparison means is provided to compare the ambient temperature with the animal temperature.

93. The tag as claimed in claim 92 wherein an indicator is disposed on the tag, the indicator being responsive to the comparison means.

94. The tag as claimed in any one of claims 89 to 93 wherein the tag comprises a one piece moulded body.

95. The tag as claimed in any one of claims 92 to 94 wherein a comparison means is provided to compare the ambient temperature with the animal temperature.

96. The tag as claimed in claim 95 wherein an indicator is disposed on the tag, the indicator being responsive to the comparison means.

97. The tag as claimed in any one of claims 92 to 96 wherein the or each sensor is provided on/in the attachment portion.

98. The tag as claimed in any one of claims 92 to 97 wherein the tag comprises a one piece moulded body.